"Proceedings of the Bath Natural History Society," is a long address by the president, the Rev. Leonard Blomefield, F.L.S., F.G.S., on "Local Biology," containing many valuable hints as to the objects which members of such societies ought to have in view, illustrated by many interesting facts and recent observations in natural history. He shows how valuable the field work of local scientific societies might be made when intelligently and judiciously conducted, not only in collecting facts as to local biology, but in helping to solve many of the most important problems which are at present occupying the attention of biologists. The main qualification for efficient work of this kind is an intelligent and sharp look-out. Mr. Blomefield concludes his paper by some remarks on the faunas of Bath and Somerset. We are glad to see the address has been printed separately, and we would recommend it to the attention of all local scientific societies. The two other scientific papers in this number are on "Devonian Fossils from the Sandstones on the N.E. of the Quantocks," by the Rev. H. H. Winwood, F.G.S., and "The Geographical Position of the Carboniferous Formation in Somersetshire, with Notes on possible Coal Areas in adjoining Districts in the South of England," by J. McMurtrie, F.G.S., the latter illustrated by a well-constructed map.

WE have received a wonderfully cheap pennyworth in the shape of a "Descriptive Guide to the Fossil Collection" of the Museum of the Leeds Philosophical and Literary Society. The pamphlet is interestingly written and well arranged, and contains a long and valuable list of useful books of reference on Palæontology.

THE Third Annual Report of the Devon and Exeter Albert Memorial Museum, Schools of Science and Art, and Free Library, is altogether a very satisfactory one. Great facilities are offered for scientific study and laboratory practice, and these appear to be largely taken advantage of. The number of individual students during the current session is 89, and the subjects at present taught in the school are Mathematics, Theoretical Mechanics, Physical Geography, Geology, Acoustics, Light and Heat, Vegetable Anatomy and Physiology, Systematic and Economic Botany, Magnetism and Electricity, and Inorganic Chemistry with laboratory practice. According to the library statistics, a very large increase during the past year has taken place in the number of scientific books sought for, both in the consulting and lending libraries.

THE following is the ephemeris of Tempel's Comet for the days named as, calculated by Mr. Hind for Greenwich midnight:—

| 1873 | True R.A.<br>h. m. s. | True N.P.D.<br>° ′ ″ | Log Δ |
|---|---|---|---|
| June 20 | 16 14 50·1 | 111 18 19 | 9·91982 |
| 22 | 14 23·7 | 111 38 44 | 9·92529 |
| 24 | 14 4·9 | 111 58 53 | 9·93106 |
| 26 | 13 53·9 | 112 18 45 | 9·93711 |
| 28 | 13 51 1 | 112 38 19 | 9·94342 |
| 30 | 13 56 7 | 112 57 34 | 9·94996 |
| July 2 | 14 10·8 | 113 16 31 | 9·95671 |
| 4 | 14 33·6 | 113 35 10 | 9·96365 |
| 6 | 16 15 5·3 | 113 53 30 | 9·97077 |

THE additions to the Zoological Society's Gardens during the past week include a black Iguana (*Metopoceros cornutus*) from San Domingo, presented by Mr. John Dutton; two golden Tench (*Tinca vulgaris*), presented by Lord Herbrand Russell; two black Kites (*Milvus migrans*), presented by Mr. H. F. Blissett; two starred Tortoises (*Testudo stellata*) from India, presented by Capt. C. S. Sturt; a smooth-headed Capuchin (*Cebus monachus*) from Brazil, presented by Mr. J. A. Horsford; a Rhesus Monkey (*Macacus erythraeus*) from India, presented by Mr. G. Cork; an Entellus Monkey (*Semnopithecus entellus*) from India; four Sturgeon (*Accipenser sturio*); two American Rice-birds (*Dolichonyx oryzivora*); five horned Lizards (*Phrynosoma cornutum*) from Texas, purchased; a Lion (*Felis leo*) from Africa; a Collared Mangabey (*Cercocebus collaris*), a Diana Monkey (*Cercopithecus diana*), and a Moustache Monkey (*C. cephus*) from W. Africa, on approval.

## SCIENTIFIC SERIALS

THE *Journal of Botany* for May commences with a critical investigation, illustrated by a plate, by the editor, of the very common but badly understood Dock, *Rumex obtusifolius*, which is followed by two papers on the distribution of plants, Additions to the British lichen flora, by Rev. M. Crombie, and Additions to the flora of Berkshire, by James Britten. In this number is also the very useful annual list of the new species of phanerogamous plants described in periodicals published in Great Britain during the year 1872. The plate which now accompanies every number is a great addition to the value of this magazine.

In the June number the illustrated article is by Mr. W. P. Hiern, on *Physotrichia*, a new genus of Umbelliferous plants from Angola, from the Welwitschian collection. Mr. F. Townsend contributes a paper on a much controverted subject, some points relating to the morphology of *Carex* and other Monocotyledons. The short notes and queries are, as usual, not the least interesting portion of these two numbers.

*Poggendorff's Annalen der Physik und Chemie*, Supplement vol. vi., part. I. This number contains the first instalment of a series of researches on the volume constitution of solid substances; a lengthy paper in three parts, the first being introductory and theoretical, the second describing methods, and the third detailing results in the case of chlorides, bromides, and iodides.—Prof. Schwedoff of Odessa follows with an interesting paper, in which he establishes a correspondence between the propagation of electrical currents in thin conducting insulated plates and that of light rays in transparent media. A "ray of electricity" is represented by the line drawn from a pole to any given point of the body, and means simply the direction in which electrical "masses" (in the plate) are attracted to the pole or repelled from it. He shows that the intensity of such rays is inversionally proportional to distance from the pole; that they are reflected (it may be oftener than once), from the edges, the angles of reflection and incidence being equal; that they do not lose intensity by reflection, nor suffer change of sign. His theory and mode of experiment are illustrated by figures.—An article by Dr. Heinrich Schneebeli on bar-magnetism, contains a full and thorough investigation of magnetic moment in permanent bar-magnets, and more especially of the position of the magnetic pole; this is determined by two different methods which do not suppose a knowledge of the law of distribution of the magnetic fluid, and the results (closely agreeing), are applied in correction of the tangent galvanometer.—Carl Pape contributes a determination of the optical constants of blue vitriol, and Alexander Müller the first part of studies on chloride of iron solutions without change of aggregate state.—Among the extracted matter may be noted an article by Kohlrausch on the reduction of the Siemens unit of galvanic resistance to absolute measure, and one by Edlund on the nature of electricity, which has already appeared in English form.

THE *Monthly Microscopical Journal* commences with an article by Dr. R. L. Maddox on an Entozoon with ova, found encysted in the muscles of a sheep, which he calls *Cysticercus oviypariens*. Then comes a very valuable paper on the development of the face in the sturgeon, by Mr. Parker, F.R.S., which, if followed by the description of a few more type-forms, will render the development of that complicated portion of the body, the head, one of the most easily understood sections of the vertebrate body. Mr. Joseph Needham gives a concise *résumé* of the methods employed for cutting sections of animal tissues for microscopical examination, in which he strongly advocates the method of freezing as "the simplest and most elegant mode" of obtaining sections of yielding tissues. Assistant-Surgeon Woodward describes how that a $\frac{1}{10}$th objective, sent to him by Mr. Tolles to test, gave a balsam angle of less than 80°, whilst a second, a $\frac{1}{8}$th of peculiar construction, having four combinations instead of three, gave the high angle of more than 100° when fully closed, and so exceeding the extreme limit assigned as attainable by Mr. Wenham. Mr. H. Davis gives further facts in support of the originality of his theory respecting the survival of Rotifera after desiccation.

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, May 8.—"Researches in Spectrum Analysis in connection with the Spectrum of the Sun."—No. II. By J. Norman Lockyer., F.R.S.

The observations in this paper are a continuation of those referred to in the previous communication bearing the same title. They deal (1) with the spectrum of chemical compounds, and (2) with the spectra of mechanical mixtures.

### I. *Chemical Compounds.*

Several series of Salts were observed; these series may be divided into two:—1st, those in which the atomic weights varied in each series; 2nd, those in which the associated elements varied in each series. The following salts were mapped:—

$Pb F_2$, $Pb Cl_2$, $Pb Br_2$, $Pb I_2$; $Sr F_2$, $Sr Cl_2$, $Sr Br_2$, $Sr I_2$; $Ba F_2$, $Ba Cl_2$, $Ba Br_2$, $Ba I_2$; $Mg F_2$, $Mg Cl_2$, $Mg Br_2$ $Mg I_2$; $Na F$, $Na Cl$, $Na Br$, $Na I$.

The conditions of the experiments are described, the same aluminium cups, described in the first paper, were used, and the poles were arranged in such a manner that they could at will be surrounded with any gas or vapour. Hydrogen was used in some of these experiments; it was purified in the usual manner by drying, and freeing from traces of sulphuretted hydrogen, it was then passed over clean cut pieces of sodium, and admitted to the poles. An induction-spark from 5 one-pint Grove cells was used, the *circuit being without the Leyden jar.*

The lead compounds behaved (in air) as follows:—

The fluoride gave the eleven longest lines of the metal, but four were very faint.

The chloride gave nine lines; one of these is very short.

The bromide gave six lines, but one is a mere dot on the pole.

The iodide gave four lines distinctly and two as dots, one of which is scarcely visible.

It is pointed out that the decrease in length and number of lines follows the increase in the atomic weight of the non-metallic element, the lines dying out in the order of their length.

Barium was next experimented on, the same series of salts being used. A marked departure from the results obtained in the case of the lead compounds was observed especially in the case of the fluoride, its spectrum being much the simplest; in fact it consisted of only four lines. Strontium behaved like barium, and so did magnesium fluoride. This anomalous behaviour was found to be most probably due to the exceedingly refractory nature of these fluorides, all of them being quite infusible, and non-volatile in any spark that was used.

Sodic fluoride, sodic chloride, sodic bromide, and sodic iodide exhibited a behaviour exactly the reverse of that of lead, *i.e.* the iodide showed most of the metallic spectrum.

The difference between flame-spectra and those produced by a weak electric discharge are then discussed. Beads of the chlorides, &c., were heated in a Bunsen-gas flame; $BaI_2$ gave a "structure" spectrum (since proved to be due to the oxide) and the line 5534·5, by very far the longest metallic line of barium; the bead fused. The bromide behaved like the iodide, and so did the chloride, except that its spectrum was more brilliant. Baric fluoride gave scarcely a trace of a spectrum, the oxide structure being scarcely visible, and 5534·5 very faint indeed. The strontium salts follow those of barium, 4607·5, the longest strontium line appearing in conjunction with an oxide spectrum. The strontic fluoride, however, refused to give any spectrum whatever. These results are compared with those obtained with the weak spark, and it is shown that the difference is one of degree; *e.g.* baric bromide gives 25 lines in the spark; these are the longest lines. In the flame it gives but one line; but this is the longest of all the barium lines, and indeed very far exceeds all the others in length. When the flame-spectra are compared with those produced by the low tension spark, the spectra of the metals in the combination are in the former case invariably more simple than in the latter, *so that only the very longest line or lines are left.*

Some experiments made by Mr. R. J. Friswell to determine the cause of the similarity of the spectra of the various salts of the same metal observed in air are then given, the conclusion being that the spectrum observed is really that of the oxide.

Kirchhoff and Bunsen's, Mitscherlich's, and Clifton and Roscoe's prior conclusions on the points investigated are stated at length; and it is shown that the observations recorded, taken in conjunction with the determination of the long and short lines of metallic vapours, are in favour of the views advanced by Mitscherlich, Clifton, and Roscoe. For while the spectra of the iodides, bromides, &c. of any element in air are the same as stated by Kirchhoff and Bunsen, the fact that this is *not* the spectra of the metal is established by the other *fact, that only the very longest lines of the metal are present, increased dissociation bringing in the other metallic lines in order of their length.*

The spectra have been mapped with the salt in hydrogen; here the spectra are different, as stated by Mitscherlich, and *the metallic lines are represented according to the volatility of the compound, only the very longest lines being visible in the case of the least volatile one.*

The following are the conclusions arrived at:—

1. A compound body has as definite a spectrum as a simple one; but while the spectrum of the latter consists of lines, the number and thickness of some of which increase with molecular approach, the spectrum of a compound consists in the main of channelled spaces and bands which increase in like manner. In short, the molecules of a simple body and of a compound one are affected in the same manner by their approach or recess, in so far as their spectra are concerned; *in other words, both spectra have their long and short lines,* the lines in the spectrum of the element being represented by bands or channelled lines in the spectrum of the compound; and in each case the greatest simplicity of the spectrum depends upon the greatest separation of molecules, and the greatest complexity (a continuous spectrum) upon their nearest approach.

2. The heat required to act upon a compound, so as to render its spectrum visible, dissociates the compound according to its volatility; the number of true metallic lines which thus appear is a measure of the dissociation, and doubtless as the metal lines increase in number the compound bands thin out.

Mitscherlich's obvervations, that the metalloids show the same structural spectra as the compound bodies is then referred to, and the question is asked whether the molecules of a metalloid do not in structure lie between those of elements on the one hand and compounds on the other.

These considerations are applied to solar and stellar spectra; the general appearance of the solar spectrum shows that in all probability there are no compounds in the sun.

Secchi's maps of a large number of stellar spectra are referred to as now indicating beyond all doubt the existence of compound vapours in the atmosphere of some stars; and it is suggested that the phenomena of variable stars may be due to a delicate state of equilibrium in the temperature of a star which now produces the great absorption of the compound and now that of the elemental molecules.

The second part of the paper deals with the mechanical mixtures. Maps of the spectra of alloys of the following percentages are given:—

| | | |
|---|---|---|
| Sn and Cd | percentages of Cd | 10·0, 5·0, 1·0, 0·15. |
| Pb and Zn | ,, ,, Zn | 10·0, 5·0, 1·0, 0·1. |
| Pb and Mg | ........................ Mg | 10·0, 1·0, 0·1, 0·01. |

It is pointed out that the lines die out in the order of their length as the percentage becomes less, the shortest lines disappearing first; and that although we have here the germs of a quantitative spectrum analysis, the method is a rough one only, but that further researches on a method which promises much greater accuracy are in progress.

The bearing of these results on our knowledge of the reversing layer of the sun's atmospheres is then discussed.

**Mathematical Society,** June 12.—Dr. Hirst, F.R.S., president, in the chair.—The following papers were read:—"Some general theorems relating to Vibrations," Hon. J. W. Strutt; "Invariant conditions of multiple concurrence of three conics," Mr. J. J. Walker; "On a new form of Biquaternion, being the ratio of two systems of forces," Prof. Clifford; "A further note on geodesic lines," Prof. Cayley.—A paper by Prof. Wolstenholme, "The locus of the point of concourse of tangents to an epicycloid, inclined to each other at a constant angle," was, in the author's absence, taken as read.—A conversation ensued on the subject of Prof. Clifford's paper, in which the president, Prof. Cayley, and Mr. S. Roberts took part.

**Geological Society,** May 28.—Prof. Ramsay, F.R.S., vice president, in the chair. The following communications were read:—"The Glaciation of the northern part of the Lake-district," by J. Clifton Ward. The author stated the leading questions to be settled by his investigation of the northern part of the Lake-district as follows:—The fact of the glaciation of the district being granted, and of this he adduced abundant evidence, the questions that arose were whether the glaciating agent worked from north to south, whether it came from within or from without the district, and finally, whether the agent was floating ice, a system of local glaciers, or an unbroken ice-cap. As the result of his investigation he maintained that there is no evidence that a great ice-cap from the north ever swept over this district. The ice-scratches trending along the principal valleys, but sometimes crossing watersheds, indicate a great confluent glacier-sheet, at one time almost covering a great part of the district, the movement of which was determined by the principal water-shed of the Lake-district. In the part of the Lake-district under consideration the ice, during its increase, carried forward, from south to north, a great quantity of rocky material. There are no signs in the district of the occurrence of mild periods during the epoch of primary glaciation, but the author thought that the climate had probably become moderate before the great submergence of the land commenced. The author noticed the effect of the submergence upon the results of previous glacial action, and maintained that when the land had sunk 800 or 900 ft. there was a recurrence of cold, and boulders were transported by floating ice. Until the submergence reached 1,500 ft. there was no direct communication between the northern and southern halves of the Lake-district except by the straits of Dunmail Raise. From the directions which would be taken by the currents in the sea at this period, it would appear that boulders may then have been transported by floating ice in some of the same directions as they had previously been carried by glacier-ice. The extreme of submergence appeared to have been about 2,000 ft. The author further maintained that on the re-elevation of the district there was a second land-glaciation, affecting the higher valleys and clearing them of marine drift.—"Alluvial and Lacustrine Deposits and Alluvial Records of the Upper Indus Basin," by Frederic Drew. The author said that he felt the necessity for a careful classification of the phenomena of alluvial deposits, for the want of recognition of the different kinds was likely to lead to incorrect deductions; the classification he proposed was the following:—I. *Loosened material*, which consisted of disjointed rocks or loose angular stones, sometimes mixed up with mud, which had been separated and disintegrated, but since that had remained *unmoved*. II. *Taluses*, the substance of which had fallen by its own weight, and not been transported by streams. These were the great heaps of angular matter that were found at the foot of cliffs, with a slope generally of near 35°. A special form was the fan-talus, which occurred where the falling matter had either originated from, or collected to, one spot, from which again it spread, and made a partial cone of the same slope as the ordinary taluses. III. *Alluvial Fans.*—These were the fan-shaped extensions of alluvial or torrential matter that spread out from the mouths of gorges, where these debouched into a more open valley. They were in form cones of a low angle, commonly 5° or so; they had accumulated by layer after layer on a cone-shaped surface, as shown by the radial sections exhibiting layers of a straight slope, and the chord sections showing curves, which were by the theory hyperbolas. Many complicated phenomena were produced by the denudation of these fans, and the production of secondary ones, some of which were illustrated by diagrams. IV. *Alluvium*, which was defined as a deposit which sloped down the direction of the valley of the stream which had made it, and did not appreciably slope or curve over in a direction at right angles to that. With regard to the country in question, there was evidence of a succession of three states:—1st, The cutting of the valleys. 2nd, The accumulation of alluvial matter. 3rd, The cutting down of the streams through that alluvial matter. Accumulation denotes an excess of supply of material from the rocks (by disintegration) over what can be carried away by the streams. Denudation, or the cutting down of the streams through their alluvium (the lowering of their beds), denotes a deficiency of supply of material from the rocks as compared with the transporting power of the streams. Hence the author inferred that the period of great accumulation of these alluvial deposits was one of great disintegration of rocks, one of intense frost; in other words, it was the Glacial period, and that the denudation occurred when the cold lessened, and there came to be a smaller supply of disintegrated material. The connection of various glacial phenomena with the alluvium, such as the one described above, was taken to corroborate the inference that the greater deposits were made during the Glacial epoch.

**Geologists' Association**, June 6.—Mr. Robert Etheridge, F.R.S., vice-president, in the chair.—"On Ammonite Zones in the Upper Chalk of Margate, Kent," by Mr. F. A. Bedwell. The author described, and showed by sections, the exact positions in the cliffs to the east and west of Margate, of fifteen large Ammonites, twelve of which lie between the Flagstaff and the Cliftonville Hotel, a space of about half a mile, and some of them exceed three feet in diameter. All these twelve are in a bed closely approximating to an exact parallel with a faint line of nodular flints which undulates over this part of the cliff and are at a constant distance of eight feet below that line. These facts indicate the following (1) The presence of an Ammonite zone, and of (2) a true sea floor. (3) The parallelism of this with the horizontal flints, and (4) that all the horizontal bands of flint must be assumed to have been aggregated before the chalk moved. Particulars were also given of three other beds of Ammonites, one to the west of Margate, another forty feet below that first mentioned, and a fourth at Pegwell Bay, at the top of the cliff near the landing-stage. The first and second were conjectured to be identical, and also the third and fourth. Specimens from the first and second beds were respectively identified by Mr. Etheridge as *A. leptophyllus* and *A. Lewesiensis*. Similar beds elsewhere were referred to, but details could only be given of one. This is to be seen at low water near the Black Rock at Brighton. A remarkable bed of continuous solid flint, three or four inches thick, occurs round and under the Isle of Thanet. Between the Foreland and Pegwell Bay it is in the upper part of the cliff, sinks below the shore at Pegwell Bay and Kingsgate, rises again to the west at the back of Margate Harbour but disappears immediately, appears again to the south, as pointed out by Mr. Whitaker in his Geology of the London Basin, at Cap Point near Walmer, and again at Shepherd's Well Station, 10 miles inland, where it is surmounted by the soft almost flintless chalk of Margate, and finally it was known throughout the island by the well diggers. This positive testimony of coincident and uniform flint aggregation over so large an area appeared to be an important fact in its bearing on the origin of flint. Mr. Bedwell stated that he had found the ammonites entirely by trusting to the zone of life theory insisted on by Mr. Caleb Evans in his paper on the Chalk (Geol. Assoc. 1870), and had failed to find them until he had selected the faint line of flints as a datum line and worked from that. He advised all young students of the chalk to examine a cliff in true horizons and not in a mere indiscriminate effort to make a large bag of specimens, to record carefully the exact chronological order of each fossil extracted by referring it to a datum line as suggested by Mr. Caleb Evans, to keep in mind the time which may have separated the life history of two fossils though only distant a few feet from each other, and to try to correlate two sections of chalk rather by the succession of zones of life in each cliff than by a mere comparison of indiscriminately collected fossils. The author in conclusion urged the importance of allowing Nature to teach her own independent lessons at the cliff side, of supplementing Nature by books rather than books by Nature, and pointed out how easy it was for those with little knowledge of details to be of service to science by simple observation and following to its end one single thread and one only, and then laying the results before scientific men, leaving them to estimate the value of the information.

**Royal Horticultural Society**, June 4.—Scientific Committee.—A. Smee, F.R.S., in the chair.—A fruit of *Anona reticulata* was sent produced in the gardens of Sir Walter Trevelyan at Wallington.—A letter was read from Prof. Westwood, stating that some grubs which had been submitted to him as having completely destroyed some bulbs, proved to belong to *Merodon clavipes*, a very rare insect in England, and in this case probably introduced.—A Pelargonium of the variety Cleopatra was exhibited from the Chiswick Garden. It had produced trusses of flowers of its proper pink as well as others of its ancestral scarlet.—Dr. Gilbert made some remarks on the proposed use of chalk mixed with coal in furnaces for horticultural purposes. He said it was quite certain the chalk could not supply any heat; on the contrary, its conversion into lime involved a considerable loss of heat in order to effect the change. What the chalk did was to absorb the heat and radiate it out again, and pieces of broken fire brick would probably answer the purpose equally well. The mixture of these substances simply, so to speak, diluted the coal.—A fine specimen of fasciated asparagus was shown from Mr. Macmillan. It has been produced two years running apparently from the same plant.

General Meeting.—Viscount Bury, M.P., president, in the chair.—The Rev. M. J. Berkeley stated that he had recently seen in Denbighshire nectarine trees, the flowers of which usually produced five carpels instead of one. He commented on the effects of the late frost on the potatoes at Chiswick. Some were very much injured, while others had escaped altogether, and in some instances of two stems to one root, one had been killed back and the other not touched.

### Philadelphia

Academy of Natural Sciences, March 4.—Mr. Vaux, vice-president, in the chair.—Mr. Thomas Meehan exhibited a flower of *Bletia Tankervillia* (*Phaius grandiflora* of some authors), in which the dorsal sepal (or, as some authors contend, petal), had united with the column, and had been much retarded in its development accordingly. He said that he had several dozen of flowers produced in this way this winter, all, however, confined to separate spikes from those which bore the perfect flowers. It was usual to pass over these appearances as "monstrosities," but in truth the whole Orchid structure was little less than a monstrosity.' He did not think as much had been made out of the changes of structure in orchids in the study of evolution, as might be, in consequence of the impression that these abnormal forms, as they were termed, were monstrosities, or the results of cultivation. There had been already on record accounts of changes in wild orchids more remarkable than many much dwelt on by many modern writers on development. He further remarked that, in examining closely the flowers of *Bletia Tankervillia* early in the morning, he found on the outside, at the base of the three exterior petals, a liquid exudation from a small gland. It was highly probable that these glands were rudimentary spurs, and that, if the course of nutrition which sustained the cohering power of an orchid could in any way be diverted before the final direction of form, each of these outer petals might take on some of the labellate character, with its attendant spur, which gave such a peculiar appearance to so many orchidaceous plants.

March 18.—The president, Dr. Ruschenberger, in the chair. —"On the Occurrence of an Extinct Hog in America."—Prof. Leidy exhibited the fragment of a lower jaw of a pig which Prof. Hayden had picked up, together with many remains of extinct mammals, in the pliocene sands of the Niobrara River, Nebraska. The specimen he viewed as of recent character, and not as a true indigenous fossil. Prof. Leidy remarked that he had never seen any remains of the hog which he could confidently view as true American fossils.—Prof. Cope stated that Dr. Hayden handed to him for determination some bones on a fragment of the Green River shale of the Eocene of Wyoming. They indicated a species of Anourous Batrachian, but as the individuals were not fully developed, he was not prepared to identify the genus. They constituted the first indication of this order in time; those previously known from Europe and India being all of Miocene age.

### Paris

Academy of Sciences, June 9.—M. de Quatrefages, president, in the chair.—M. Dupuy de Lome presented to the Academy, in the name of the Minister of Marine, the first number of the "Memorial of Marine Artillery" and its appendix, "The Artillery Remembrancer." These are published for the use of French naval officers, and contain an immense amount of information on the armament of foreign ships of war. Great space is devoted to English naval matters, and the Memorial is well worthy of the attention of our own naval authorities. —The following papers were read:—Researches on new propyl derivatives, No. 2, by M. A. Cahours. The glucinum, silicon, and boron compounds of propyl were described.—On normal and abnormal speech, by M. Bouillaud.—On the intervention of atmospheric nitrogen in the phenomena of vegetation, by M. P. P. Dehérain. The author described some experiments which showed that, in the presence of ammonia, glucose absorbs nitrogen from the air.—On the multiple causes which provoke the fall of lightning, by M. W. de Fonvielle.—On the theory of the spots and the dark nucleus of the sun, by M. E. Vicaire. The author replied to M. Faye's recent answer to him; he thinks that Respighi's observations quoted by M. Faye tend to support his views rather than those of that astronomer, *i.e.* that the absence of the chromosphere over the spots is due to a cessation of the emission of the gases of which it is composed, and not to their being swallowed up by a cyclone.—Researches in spectrum analysis in relation to the spectrum of the sun, by Mr. J. N. Lockyer. This was a letter to M. Dumas giving an account of the author's late paper read before the Royal Society.—An answer to M. Raynaud's late note on the resistance-maxima of magnetic coils, by M. Th. du Moncel.—On the relation between electric and capillary phenomena, by M. G. Lippmann.—On the boiling points and molecular volumes of the chlorinated isomers of the ethylic series, by M. G. Hinrichs. —On ethylacetylene formed by synthesis, and on its identity with crotonylene, by M. L. Prunier. The author has synthesised this body by passing equal volumes of ethylene and acetylene through a porcelain tube heated to dull redness.—On the synthesis of phenyl-allyl, by M. Chojnacki. The author obtained this body by acting on a mixture of equal weights of benzine and iodide, or bromide of allyl, with ¼th of its weight of powdered zinc.—On the combinations of titanic chloride with the ethers, by M. Demarçay.—On phenyl-cyanine, by Mr. T. L. Phipson.—Note on M. Mène's paper on the preparation of ammonic sulphate from nitrogenous waste, by M. L'Hote.—On the estimation of phosphoric acid in manures, coprolites, and fossil phosphates, by M. Ch. Mène.—Mineralogical note on the dibasic plumbic sulphate of l'Ariége, by M. E. Jannettaz.—On the affinities of *Etheostomata* (Agassiz), by M. L. Vaillant.—Magnetic observations, by M. Diamilla-Muller.—Spectroscopic researches on the fumerolles of the eruption of Vesuvius of April 1872, and on the actual state of that volcano, by M. L. Palmieri. This was a very short extract from a letter, the only points being that thallium and boric acid are found in the sublimates from these vents, and that since the eruption the mountain has exhibited a state of abnormal quietude.

## DIARY

*THURSDAY*, June 19.

Royal Society, at 8.30.—On the Fossil Mammals of Australia, Part IX. Family Macropodidae: Prof. Owen, C.B.—On the Nature and Physiological Action of the Poison of Naja Tripudicans, and other Indian Venomous Snakes: Dr. Fayrer and Dr. Brunton.—Researches in Circular Solar Spectra Applied to Test Residuary Aberration in Microscopes and Telescopes: Dr. Royston-Pigott.—On the Structure and Development of the Skull in the Pig (*sus scrofa*): W. K. Parker.—Results of the Comparisons of the Standards of Length of England, Austria, Spain, United States, Cape of Good Hope, &c.: Lieut.-Col. Clarke.—On Comparative Vegetable Chromatology: H. C. Sorby.

Society of Antiquaries, at 8.30.—On Further Excavations at Silchester: Rev. J. G. Joyce.

Linnean Society, at 8.

Chemical Society, at 8.—On the Influence of Pressure upon Fermentation. Part II.: Horace Brown.—Researches on the Action of the Copper-Zinc Couple on Organic Bodies, III., and on Normal and Iso-Propyl Iodides: Dr. J. H. Gladstone and A. Tribe.—On Cymenes from different sources optically considered: Dr. J. H. Gladstone.—On the Action of Bromine on Alizarine: W. H. Perkin.—On some Decompositions and Oxidation Products of Morphine and Codeine Derivatives: E. L. Mayer and Dr. C R. A. Wright.—On the Decomposition of Tricalcic Phosphate by Water: R. Warrington.—On a new Tellurium Mineral, with Notes on a Systematic Mineralogical Nomenclature: J. B. Hannay.—Communications from the Laboratory of the London Institution, No. XII;—On New Derivatives of Cresol: Dr. H. E. Armstrong and C. L. Field.

Numismatic Society, at 7.—Anniversary.

*FRIDAY*, June 20.

Medical Microscopical Society, at 8.—The Pathological Relations of Diptheria and Croup: Jabez Hogg.

*MONDAY*, June 23.

Geographical Society, at 8.30.

*WEDNESDAY*, June 25.

Society of Arts, at 4.—Anniversary.

Geological Society, at 8.—On Six Lake-basins in Argyllshire: His Grace the Duke of Argyll, K.T, F.R.S., President.—Description of the Skull of a Dentigerous Bird (*Odontopteryx toliapicus*, Owen), from the London Clay of Sheppey: Prof. Richard Owen, F.R.S.—Contribution to the Anatomy of *Hypsilophodon Foxii*, Huxley: J. W. Hulke, F.R.S.—On the Glacial Phenomena of the Long Island, or Outer Hebrides: James Geikie.—On Fossil Corals from the Eocene Formation of the West Indies: Prof. P. Martin Duncan, F.R.S.—Note on the Lignite-deposit of Lal-Lal, Victoria, Australia: R. Etheridge, Jun.

*THURSDAY*, June 26.

Society of Antiquaries, at 8.30.

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